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THESIS

WHAT PRACTICES IN AIRPORT SECURITY SHOULD
THE UNITED STATES IMPLEMENT AT COMMERCIAL
AIRPORTS IN LIGHT OF THE EVENTS OF SEPTEMBER
11, 2001?

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June 2002

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The terrorist attacks of September 11, 2001 changed forever the way America views its everyday safety, as well as the safety of how we travel. The United States government took swift and dramatic action to change civil aviation security with the passing of the Aviation Transportation and Security Act (ATSA) of 2001. In the months following the attacks, politicians and the media made their viewpoints known while civil aviation security professionals have been unheard.

The objective of this thesis is to ascertain the best practices and recommendations of these stakeholders to provide the highest level of security at our nations airports. To gather these data, the researcher conducted on-site interviews of these professionals.

The study reveals civil aviation was not adequately prepared for the terrorist attacks of September 11. Congressional mandates of the ATSA have driven government's behavior. The lack of aviation experience of senior leadership and its top-down approach has alienated stakeholders. Other key government issues include funding constraints, potential complacency and conflicts of interest.

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The terrorist attacks of September 11, 2001 changed forever the way America views its everyday safety, as well as the safety of how we travel. The United States government took swift and dramatic action to change civil aviation security with the passing of the Aviation Transportation and Security Act (ATSA) of 2001. In the months following the attacks, politicians and the media made their viewpoints known while civil aviation security professionals have been unheard.

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I. INTRODUCTION

The terrorist attacks of September 11, 2001 changed forever the way America views its everyday safety, as well as the safety of how we travel. The United States government took swift and dramatic action to change civil aviation security with the passing of the Aviation Transportation and Security Act of 2001. While the politicians and media quickly made their viewpoints known, civil aviation security systems professionals have gone largely unheard.

The objective of this thesis is to ascertain the best practices and recommendations of these unheard experts to provide the highest level of passenger and employee security at our nation's airports. To gather these data, the researcher conducted on-site interviews with aviation security stakeholders, all of whom are recognized leaders in their fields of expertise.

A. THE PROBLEM

How can America prevent future terrorist attacks against the United States? The Aviation Transportation And Security Act imposes stringent security measures and created a new federal regulatory agency, the Transportation Security Administration (TSA). The TSA has imposed its regulations without regard to their effects on the economics or the daily operations of its constituency and the flying public. This agency started with no employees and is scheduled to hire an estimated 60,000 or more personnel. Senior leadership of the TSA is weighted heavily with law enforcement personnel who have little or

no aviation experience. The TSA has ignored the views of aviation experts, resulting in a top-down, heavy-handed approach that has drawn heavy criticism.

B.   THE SOLUTION

Teamwork between federal government and aviation stakeholders is paramount. First, they must address the human factor: properly compensated, qualified and trained security personnel will best prevent future attacks. Next, identify potential threats before check-in by using technology such as passenger profiling and a "trusted traveler" program. Finally, a layered security approach, which does not to rely too much on any one system, will yield the best results.

C.   CONSEQUENCES

If the federal government cannot work with aviation stakeholders to find the best ways to improve airport security procedures and protocols, then the result is likely to be hastily implemented and costly—yet potentially ineffective—solutions.   In the rush to meet federal mandates, high-quality results are being set aside and billions of taxpayer dollars wasted.

II. METHODOLOGY

A.   INTRODUCTION

The methodology used in this research consisted of an extensive literature search and review of newspapers, magazines, professional journals and Internet articles. In addition, a semi-structured survey containing open-ended questions (Appendix A) was developed and used to seek opinions from aviation security professionals. These interviews were conducted either in person or by phone. Of the eight confidential interviews, six were conducted in person, two by phone. Two additional surveys were conducted by phone to gain additional insights and round out the variety of interview participants. The thesis discusses the seven main themes distilled from these interviews.

Much of the research focused on the development of the newly created Transportation Security Administration (TSA), a federal agency under the auspices of Department of Transportation (DOT). The study examines incidents and political circumstances that led to the TSA's replacement of its predecessor, the Federal Aviation Administration (FAA), in the field of aviation security. Included in this discussion are events in aviation security since September 11, 2001 and their impact on government action and public perception.

The research also includes a recent history of aviation security systems in Europe and Israel and their potential influence on America's aviation security systems.

The majority of the research for this paper was completed by 31 May 2002. Any major regulatory decisions made by the Department of Transportation, the Transportation Security Administration, American airports and airline players and stakeholders after 31 May 2002 are not included and their effects not considered.

B.   LITERATURE REVIEW

Literature dealing with aviation security systems before and after September 11 events is abundant. Internet web pages and articles, as well as articles in newspapers, magazines, and professional journals, were cross-checked to ensure accuracy of quotes and facts. Because the changes in aviation security since September 11, 2001 are so recent, no books addressing the focus of this thesis were available.

C.   QUESTIONNAIRE

A semi-structured questionnaire (Appendix A) was used to tap stakeholders' knowledge and opinions concerning the path America should take towards improving civil aviation security for employees and passengers.

The questionnaire addressed stakeholders' views on several fronts: what emphasis did America place on aviation security before 9/11? What did they think about federalizing the passenger and baggage screening functions? What was their opinion of the way aviation security is performed in Europe and Israel? Should security be localized or centralized? What is the impact of the TSA's guidelines? What is the effect of profiling? And, finally, what kind of aviation security system would work best for America?

1. Interview Questionnaire Development

The questionnaire was developed, in part, as a response to the recommendations for improved security that politicians and media personalities started to make immediately after the tragic events of September 11. Congress rushed to nationalize baggage and passenger screening of airport security. The media and politicians rushed to judge the system as faulty and in need of immediate, radical correction. However, there was a real lack of direction coming from the major stakeholders themselves: airport operators, airlines, and the Federal Aviation Administration. The approach of this thesis is to get the thoughts and opinions of stakeholders who are close to the industry and/or work in the daily operations of aviation security and to ask them how to implement best practices and procedures.

D. INTERVIEWS

The researcher drafted the original set of questions from his perspective of an outsider to the industry. After the first interview, it was apparent that the list would have to be tailored to elicit responses that would be applicable to the goals of the research. After attending the Second Annual Aviation Security Summit (26-27 March 2002) in San Francisco, the researcher further modified the questionnaire to get the desired information.

Interviews were conducted in person unless time or distance would not permit. All but two of the interviews were conducted in person, with the other two being done via telephone.

E.   STAKEHOLDER ANALYSIS

The researcher interviewed four types of respondents: airport security operators, industry trade representatives for airports and air carriers, airport security consultants, and employees of federal government agencies that either directly support or inspect airport/air carrier security procedures. The purpose was to develop both an operating- and a policy-level perspective.

III. BACKGROUND AND HISTORY

On September 11, 2001, the terrorist group al Qaeda hijacked four U.S. airliners. What made these hijackings unique was their purpose: to use a fully fueled airplane as a missile to direct an attack on the United States. The terrorist plan was well thought out, well planned, and well executed (Teebay, 2002). It played on the weaknesses of our aviation security systems.

The hijackers studied our security system, looking for weaknesses and vulnerabilities, and they took advantage of Americans' traditional views of a hijacking. We had been trained to stay calm, take a passive role, and let the authorities take charge. Rarely have we seen fatalities in these previous scenarios. Prior to the actual hijacking, the terrorists did not break any Federal Aviation Administration (FAA) regulations regarding luggage or carry-on items (Teebay, 2002).

The September 11 terrorist against the World Trade Center and the Pentagon changed America's attitude about its invulnerability to foreign threats. It changed our entire way of thinking about our own security. Air travel, until this time, seemed easy, convenient (in terms of security and baggage delays) and carefree. Terrorism was something that happened somewhere else. Our sympathy went out to all those victims and governments who had to battle it overseas.

Civil aviation security experts believe what broke down was our intelligence (Lewandowski and Arena, 2002). At least two of the hijackers had been in America for

months (Reuters, 2002), learning our system to use it against us (Teebay, 2002).

In November 2001, Congress passed the Transportation and Security Act (ATSA)(PL-107-71) nationalizing baggage and passenger screening functions of airport security. This act created the Transportation Security Administration (TSA), which has been given the task of assuming the federal security functions of the Federal Aviation Administration (FAA). Original manpower estimates of 18,000 personnel have climbed threefold to an estimated 60,000 personnel. The government's goal is to hire them by the end of 2002. A new federal agency of this size has not been started since World War II (TSA, 2002).

The terrorists exposed our reliance on air carriers to provide adequate passenger and baggage screening protection. Now, the question is not only how fast can we provide adequate security, but how? At what cost: who can provide the best security with the least cost? Can this come from the private sector, or is this an issue that only the federal government can handle? How can we implement changes to our system without chasing away passengers with inconvenient and intrusive methods? And how can we implement changes without driving air carriers and airports to financial ruin?

A.   HISTORY OF THE FAA

Previous to September 11, the Federal Aviation Administration (FAA) had purview over aviation security. Congress initiated the FAA with the Air Commerce Act of May 20, 1926. Its purpose was to promote air commerce, issue and enforce air traffic rules, establish airways, and

operate and maintain aids to navigation (FAA 2002a). When the FAA was created under the auspices of the Department of Commerce, security was not mentioned as a focus.

As aviation grew and saw the introduction and evolution of jet airliners, a series of midair collisions spurred the passage of the Federal Aviation Act of 1958. With its passage, the Federal Aviation Agency was created. Its new duties included a consolidation of previously shared duties relating to air navigation and traffic control (FAA 2002b).

In 1966, aviation transportation was combined with other methods of transportation under a cabinet-level Department of Transportation. The FAA changed from an Agency to an Administration.

1. The Development of Anti-Hijacking Regulations

Several notable hijackings in the 1960s caused the FAA to focus on the security aspect of civil aviation (FAA 2002b). The Anti-Hijacking Act of 1974 addressed actions to stop hijacking attempts. Among the provisions addressed were: international support for terrorism; sanctions against foreign countries not providing a minimum level of security for air carrier contents; passenger searches; and passenger and baggage screening procedures. This Act laid out the protocol for dealing with hijackings—until September 11, 2001.

Discussions were held when the 1974 Act was passed regarding limitations of personal carry-on items; personal knives with blade lengths up to four-and-one-half inches were allowed onboard commercial airlines. The thinking at that time was that no one could hijack a plane with these

knives, and, therefore, that they did not constitute a threat. The weapons used by the September 11 hijackers were completely within FAA guidelines (Teebay, 2002).

B.   THE ROLE OF AIR CARRIERS IN AVIATION SECURITY PRIOR TO SEPTEMBER 11

With the current scrutiny of airport security, it is important to clarify the responsibilities of air carriers versus those of the airport itself.

Air carriers do not perform their own screening, but instead contract out to private security firms. There are almost 100 security screening companies employing almost 18,000 screeners at U.S. commercial airports (GAO 2000b). Some of the larger airports actually use several companies at various checkpoints.

A common misconception perpetuated by the media in the aftermath of September 11 is that airports employ "airport screeners"; their correct title is airline screener. Airport security entails security functions involving all other aspects of protecting the airport: employee, contractor and vendor access points.

Because of the relative safety from hijacking that America has enjoyed, as well as air carriers' ever-present emphasis on minimizing customer inconvenience, the air carriers viewed the screening function as a cost center instead of a major security concern. With this in mind, any savings achieved in screening would add to the profit margins of virtually all U.S. air carriers. According to the Air Transport Association (Swierenga 2002), Table 1 below demonstrates this fact:

Year	Net Profit as a percent of Revenue	
	Airline Industry	U.S. Industry
1990	-5	4.5
1991	-2.5	3.7
1992	-6	4.1
1993	-2.4	7.2
1994	-0.3	5.4
1995	2.7	6.0
1996	2.9	6.1
1997	4.7	6.1
1998	4.3	6.1
1999	4.5	6.6
2000	2.0	6.5
2001	-5.7	6.0
2002	-2.5 Estimate	6.0 estimate

Table 1.   Average Net Profits of Air Carrier vs.
U.S. Industry. From:
www.airlines.org/public/industry/bin/outlook.pdf.

A cause of low-quality screeners is the industry's thin profit margins and the resulting minimum wage for screeners. As one anonymous airport advocate stated: "This was fundamental to the economic philosophy of the air carrier which is you want to pay the minimum." Airlines

are "for profit" organizations and must answer to the shareholder for their financial performance.

In 2001, the industry lost over seven billion dollars (Hallett 2002). Airlines were experiencing a downturn, and the events of September 11 accelerated the losses. That figure includes the four billion dollars the industry received as part of the emergency federal cash compensation from the Air Transportation Safety and System Stabilization Act. In other words, without the subsidy, the industry would have lost $11 billion dollars. This industry is traditionally debt-heavy, and the airlines must have cash to operate because they are constantly paying on debt service and have numerous fixed costs.

C. THE RECENT HISTORY OF AIRPORT SECURITY PRIOR TO SEPTEMBER 11, 2001

Problems have been identified in recent years by such entities as the Congress, the General Accounting Office and the Gore Commission to alert the public to the continual problems with our aviation security systems. This section looks at various milestones, responsibilities, challenges and problems prior to the events of September 11. While there are additional findings, those presented here exemplify the known reported concerns.

Airport screening began with the FAA anti-hijacking emergency rule of December 1972, which required U.S. air carriers to scan all passengers and to inspect all carry-on baggage for weapons and dangerous objects (FAA 2002b). This was in response to several U.S. hijackings in the 1960s.

In investigating the causes of the events of September 11, the Gore Commission made many recommendations. Two GAO reports identified serious concerns regarding screeners' performance and security breeches at airports.

1.   The Federal Aviation Reauthorization Act of 1996

Congress recognized the continuing threat of terrorist attacks against Americans via bombing, kidnapping and destruction of civilian airliners. The Federal Aviation Reauthorization Act of 1996 required FAA reports or action in many aviation security areas, including: the possibility of transferring security responsibilities from airlines to airports or to the government; the certification of screening companies; weapons and explosive detection systems; passenger profiling; employee background checks; federal funding usage; and baggage matching.

2.   The Gore Commission

The President established a Commission on Aviation Safety and Security (the Gore Commission) in August 1996. Its aim was to:

> study matters involving aviation safety and security, including air traffic control and to develop a strategy to improve aviation safety and security, both domestically and internationally (Gore Commission, 1997).

The Gore Commission focused on how the government could behave more like the private sector, while bringing down government spending. Three mandates were assigned: (1) identify changing security threats; (2) identify aviation industry changes; and (3) take advantage of technological changes in air traffic control.

The President wanted security examined in light of the crash of TWA Flight 800. The key security recommendations

were that the federal government must: (1) lead the fight against civil aviation threats; (2) commit greater resources to improving aviation security; and (3) work more cooperatively with the private sector and local authorities in carrying out security responsibilities.

However, the Commission expressed its frustration with these findings:

> Sadly we remain, as noted eight years ago, by our predecessor commission, President Bush's Commission on Aviation Security and Terrorism which concluded that, "The U.S. civil aviation security system is seriously flawed and has failed to provide the proper level of protection for the traveling public. This system needs major reform. Rhetoric is no substitute for strong, effective action" (Gore Commission, 1997).

3. **Government Accounting Office Reports**

   a. *Breeches at Federal Agencies and Airports*

   In the "Breeches at Federal Agencies and Airports" report (Dillingham 2000a), Congress asked the Government Accounting Office (GAO) to investigate potential breeches, by criminals or others, to 19 federal facilities and two commercial airports. Its purpose was to determine whether badges and credentials available for purchase on the Internet or other public sources would allow terrorists to enter secure facilities and gain access to protected public buildings and airports.

   GAO agents made 21 attempts to gain access with false IDs and were successful on all 21 attempts—18 times on the first attempt and three times on the second. In the two incidents at commercial airports, agents used tickets issued in undercover names and identified themselves as armed law enforcement officers. They were freely waved

around checkpoints without further screening. The results of this report were well publicized in the media.

b. *Long-Standing Problems Impair Airport Screeners' Performance*

The report "Long-Standing Problems Impair Airport Screeners' Performance", addressed Congress's concern about the effectiveness of screening checkpoints and of the efforts to improve them, they asked GAO to examine: the causes of screeners' problems in detecting dangerous objects and the efforts of the FAA to address these problems; and the screening practices of selected foreign countries and the potential for using these practices to help improve screeners' performance in the United States.

The report (Dillingham, 2002b) determined that screener effectiveness has been a long-standing problem due to rapid turnover and human factors such as repetitive tasks, job-related stress, screeners' aptitude for the work, and lack of threat object training [1]. One reason for rapid turnover was the low wage compensation at or near minimum wage[2]. In numerous cases, the local airport fast food restaurant paid a higher wage than the screeners received.

The FAA had been pursuing several initiatives to remedy these ongoing problems, but the GAO concluded that most of these efforts are behind schedule. For example, the FAA is two years behind schedule in issuing a regulation requiring the certification of screening companies as mandated by the Federal Aviation

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[1] Training for screeners to determine whether an image on an x-ray screen or triggering of a metal detector's alarm indicates a security concern and the proper actions to take.

[2] Dillingham 2000b, page 25.

Reauthorization Act of 1996. It had not: (1) completed and integrated [its] plan to tie its various efforts to improve screeners' performance to the achievement of its goals; and (2) adequately measured its progress in achieving its goals for improving screeners' performance.

As part of its recommendations, the GAO observed screening in five countries: Belgium, Canada, France, the Netherlands and the United Kingdom. Significant differences were noted, such as higher wages[3] and better benefits, and more extensive training and screening responsibility assumed by the government or airport authority versus the air carrier (except in Canada).

GAO was critical of the FAA's lack of an integrated plan detailing how its efforts to improve screeners' performance was related to the goals required by the Government Performance and Results Act of 1993. GAO recommended that the FAA's integrated checkpoint screening management plan be promptly completed, implemented, continuously monitored and updated, and periodically evaluated for effectiveness.

4.   FAA Criticism by Aviation Authorities

Aviation experts have said that if the FAA had been tougher in exercising federal oversight, the TSA might not have been established. The FAA's failures to implement the recommendations in the previously cited reports led to its own demise in the security enforcement function.

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[3] All paid more relative to those countries wages, than the U.S.: France paid about $5.15, Canada paid $5.34, the Netherlands about $7.50 (considered a middle class income), U.K. about $8, and Belgium paid about $14 to $15 U.S. dollars per hour. Source: Dillingham 2000b, page 37

A former federal regulator places the blame for the events of September 11 in this statement:

> I take it out on the government. In the end, the airlines do what they are supposed to. Because they are private business[es], they are supposed to try and get away with everything they can to save the bottom line, to make their investors on Wall Street happy. That is how this game works. The flip side is we expect our aviation cops, the FAA, to keep us safe. That is the weak link. That is the one thing you can't get around no matter how you do the scenario. The people, who by law are supposed to protect us, didn't. (Schiavo, 2002)

An aviation security expert commented that the FAA seemed to be unwilling to make the tough decisions. To get around making decisions, it was easy to study any issue to death or assign it to a Commission. That, says the expert, "explains why the FAA failed to do anything about the professionalism of screeners from September 1996 (the time of the Gore Commission report) until after September 11, 2001." (Kauvar 2002)

D. EVENTS OF SEPTEMBER 11, 2001 AND THE EVOLUTION OF THE TRANSPORTATION SECURITY ADMINISTRATION

In the aftermath of the terrorist attacks of September 11, 2001, Congress passed the Aviation and Transportation Security Act (ATSA) of 2001(ATSA 2001). It created the Transportation Security Administration (TSA), which succeeded the FAA as the agency with primary responsibility for civil aviation security. The TSA falls under the Department of Transportation and its director, John McGaw, who holds the position as Under Secretary of Transportation for Security.

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1. **Highlights of the Aviation and Transportation Security Act of 2001**

The Aviation and Transportation Security Act (ATSA) of 2001 also includes other vital transportation means, such as rail, maritime (including Port Authorities) and other surface links. Aviation security will become a direct federal responsibility. This marks a significant change in attitude, making aviation security, as the Gore Commission recommended, a national security issue instead of an aviation issue.

There are ten major calendar milestones to meet on or before December 31, 2002. The pertinent major mandated provisions are:

- One hundred percent baggage screening by December 31, 2002.

- Deploying sufficient explosive detection systems (EDS) so that 100 percent of checked baggage can be screened for explosives by December 31, 2002.

- Assumption of the passenger and baggage screening function from the air carriers, with tough new employment hiring and firing criteria. Significantly improved baggage screeners training, wage compensation and the generous benefits of federal employment.

- Appointment of Federal Security Directors at each major airport. Depending on the size of the airport, they could be responsible for several airports in the immediate area. They will oversee federal security operations at the nation's airports and be responsible for a full range of airport security, enforcement and oversight.

- New level of cooperation with other federal agencies to fight against potential terrorist threats.

- Tougher guidelines for airport perimeter security.

- Increased funding for research and development to enhance transportation security.

- 100 percent screening of employees and vehicles— i.e. same standards as passengers.

- Federal funding to help airports cover costs of federally mandated improvements, if not already provided.

- Security Screening Pilot Program. Under this program, effective immediately, five airports (of different categories), can request permission to keep private security at their airport for a three-year evaluation period. The TSA must choose five from all the airports that so request.

- Security Screening Opt Out program. Effective November 19, 2004, an airport can opt out of using federal screeners and return the screening function to private contractors as long as the private contractor can provide screening services and protection equal to or greater than Federal Government personnel and it is owned and controlled by a U.S. citizen. - Computer-Assisted Passenger Pre-screening: used to evaluate passengers for threat potential during check-in.

Regarding the proposed changes, Kauvar (2002) stated:

Many of the Commission's recommendations are now part of the Aviation and Transportation Security Act, not because they would have averted the September 11th attacks, but because they make sense in responding to the existing threat to civil aviation, which the Commission rightly identified as a national security issue.

E. TSA'S SCOPE AND CHALLENGES

The Aviation and Transportation Security Act was drafted, signed and implemented just over two months after the terrorist attacks of September 11. Although forceful, sweeping, and dramatic, the new statutory laws are vague, with little or no clarification from TSA (Denari 2002).

TSA is a brand-new stand-up agency with all the challenges of a new organization—an accelerated ramp up, hiring, training, technology acquisitions, and deadlines to meet. There are twelve provisions to be enacted immediately. (Appendix B).

There is much evidence to demonstrate that the goals are too ambitious to implement by the end of 2002 (Davis 2002). TSA has to modify several major provisions to meet the letter of the Act versus the spirit intended by Congress. Some examples of this are: TSA's making the air carriers match passengers to bags versus physically inspecting all bags; the continued use of the highly criticized security vendor Argenbright; and the implementation of explosive trace devices versus all EDS.

This section looks at challenges involved in implementing the major provisions of the ATSA act, including organizational, funding, and Explosive Detection System issues, as well as stakeholders' views.

1. Start-Up Agency

Major challenges include hiring, training and deploying a rapidly expanding force of approximately 60,000 personnel at America's 453 commercial airports. Original estimates were 40,000 in the early days of the bill's passing. That number has increased 50 percent since then and 333 percent beyond the 18,000 currently used by private contractors.

2. Federal Representation at the Local Airport

Heading TSA representation at the airport level is the newly created position of Federal Security Director (FSD). The FSD is responsible for overseeing federal security

operations, including screening, enforcement and oversight at these airports. Some will have more than one airport in their purview. So far, 21 of the 81 positions have been announced. Of the 21, only two have significant aviation background; eight are from federal law enforcement; seven are retired military; and three are from local law enforcement (TSA, 2002).

3.   Funding

The start-up costs to implement the act are rapidly increasing (Johnson, 2002). In April 2002, The President asked Congress for an additional $4.4 billion to continue operations. Congress recently rebuked the TSA when it was unable to justify the supplement with details (Johnson, 2002).

Key money drivers are screeners, law enforcement officers, FSMs, and air marshals, as well as the pace and type of EDS installation (Mead, 2002). Ken Mead, Inspector General of the Department of Transportation, stated in February of 2002 that "the pace of events since 9/11 has caused substantial fluidity in the budget numbers. . . . Clearly, a supplemental appropriation will be needed." Mead estimates the new employee level for TSA will be between 60,000 to 72,000. A Congressman noted that a force of 72,000 would be larger than the U.S. Coast Guard (Johnson, 2002). Table 2 presents budget projections.

	FY02	FY03
EDS	1.9-2.5B	N/a
EDS Infrastructure	2.3B est.	N/a
TSA workforce cost	1.6-1.8B*	2.7-3.3
Projected Revenue	$2.0-2.4	2.4
Worst case Projected Shortfall	4.6B	.9
Best Case Projected Shortfall	3.8B	.3

* Based on 40,000 employees by November 2002 deadline. New estimate is between 60,000-70,000 employees.

Table 2.   DOT IG Budget Forecast for FY02 and FY03 (In billions of U.S. Dollars). From Mead, 2002.

4.   Explosive Detection System (EDS) Machines

This equipment represents the frontline technological defense against terrorist bomb threats. The cost is approximately $1,000,000 per machine. EDS requirements range from 1,850 to 2,200 units needed at America's airports.   As of April 2002, 178 EDS machines were in place.   Due to production limitations, the estimated shortfall is between 700 and 1,400 machines (Mead, 2002).

EDS machines weigh about 2,500 pounds each and take a large amount of space, regardless of where they are installed. If they are installed in the airport concourse area, space for queuing passengers may be lost.   The other approach is to incorporate them into one large baggage system for the entire airport (Martin, 2002).   These machines, in total, must be able to process approximately 1.4 billion pieces of luggage each year (Martin, 2002).

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Most airports have more than one airline, each using different baggage systems. At this time, they are neither geared up nor have the infrastructure to incorporate a single luggage system. San Francisco International Airport is one of the few to incorporate a European style system, having installed theirs in 1998. To do so requires millions of dollars and months of work (Denari, 2002). Each machine accounts for approximately 20 percent of the total cost of EDS when installation and infrastructure support are factored into the total investment (Davis 2002).

Trace Detection equipment is now going to supplement EDS until enough EDS machines are available. This equipment is readily available, but, although lower-cost, is less capable than EDS. Once the EDS machines arrive at their assigned airports, they may still sit in storage for long periods due to the expensive and time-consuming infrastructure changes (Davis, 2002).

Secretary of the Department of Transportation Norman Manetta twice has admitted that the 100-percent EDS mandate is unreachable (Davis, 2000).

5. Management of Personnel, Goals and Objectives

To upgrade professionalism for baggage screeners, new criteria for hiring, training, testing and compensating were implemented. Conditions of continued employment are based on attaining satisfactory annual performance reviews.[4]

The TSA Secretary "may employ, appoint, discipline, terminate, and fix the compensation, terms, and conditions of employment of Federal service for such a number of

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[4] Section 111, (5) Annual Proficiency Review.

individuals as the Under Secretary determines to be necessary to carry out the screening functions…"[5]

Long standing concerns about the ability of supervisors to terminate well-protected federal employees was voiced but no additional powers of termination were specifically noted. The researcher closely studied the wording of the ATSA and determined no additional termination powers were included beyond what the FAA had previously. One airport advocate, who was interviewed for this research, noted this issue was not specifically addressed in the ATSA. He said, "It's subtle. Note that the personnel do not get included in federal retirement and the [TSA] Secretary is given discretion over personnel rules, etc." However, the TSA Secretary does have the right to review, and revise as necessary, any standard, rule, or regulation governing the employment of individuals as security screening personnel.[6] Whether it will be hard or easy to terminate employees, therefore, will depend on regulations yet to be written.

The ASTA delineates a "results-based"[7] management philosophy using measurable goals and milestones to determine levels of performance, and providing annual progress reports to Congress, as mandated, for all government agencies, by the Government Performance and Results Act (GPRA) of 1993.[8]

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[5] Section 111, (d) Screener Personnel.

[6] Section 111, (3) Examination; Review of Existing Rules.

[7] Section 130, Results Based Management.

[8] Section 130, Results Based Management.

6.   Stakeholder Comments

Airport Security Directors say that TSA is not seeking their advice and knowledge of airport security operations. They see the TSA as having a "Secret Service" mentality, resulting in frustration and communications breakdown (Johnson, 2002; Power, 2002). Denari [2002] says TSA provides little or no clarification regarding guidance and fails to recognize the expertise of all stakeholders.

F.   AIRPORTS' CHALLENGES

America has the largest aviation system in the world terms of flights, passengers and baggage handled (Martin, 2002). As our commercial aviation system evolved, no two airports were designed alike. All are run by a state, county, municipality or port authority. Each airport's circumstances are different and unique, and their challenges are many. In addition to implementing EDS and securing funding to support ongoing operations and federal mandated security changes, they must, at the same time, establish a good working relationship with the TSA and continue to provide the best customer service possible with minimal disruption.

1.   Implementing EDS into Airport Baggage Systems

While all airports are different in terms of design and location, there are some similarities in baggage systems designs that present challenges to implementing EDS in accordance with the mandate. Dr. Gerry Kauvar (2002), Former Staff Director for the White House Commission on Aviation and Safety, points out:

> What large airports have in common is cramped, noisy areas into which complex conveyer belt

systems are incorporated, often hung from the ceiling which limits the amount of load that can be placed on them-[as well as]exposure to the weather, the need to accommodate a wide variety of baggage handling ground equipment and lots of people. The workload is uneven, and baggage-tagging systems are not standard. Many airports have different luggage systems where each airline has their own baggage check at the same airport. You could have several different systems.

2.   Funding Issues

The funding for airports has been challenging. In general, airports are non-profit organizations run by a local government or port authority. Any profits realized are used to provide funds for continued maintenance or improvements to the airport itself. The only exception is taxes received from concession sales, which can go to the local government.

A few airports generate profits for their municipalities, such as San Francisco, Seattle, New York and a few others. This is due to some grandfathered laws that are no longer on the books. In these cases, the city relies on the revenue generated by the airport and, therefore, a loss of profits affect not only the airports' finances, but also the cities'.

Table 3 illustrates the various sources from which airport revenues are generated.

Airport revenue sources	Percentage
Rents and landing fees	35
Parking, Retail, Concessions	31
Airport Improvement Program (AIP)	22
Passenger Facility Charges	10
State and Local Funding	2
Total	100

Table 3.   Typical Airport Funding. From   FAA
Form 5100-125, CY 1999.

The terrorist attacks have forced airports to look for
other options for funding.   Many had to make hurried
decisions to quickly meet new federal requirements
involving restructured parking facilities to incorporate
barriers, which results in fewer parking spaces,
inconvenience, and revenue loss. The ATSA allows for use of
some federally funded monies normally provided (such as the
federally supplemented Airport Improvements Program or AIP)
to be diverted to security-related improvements. At the
Second Annual Aviation Security Summit in San Francisco in
March 2002, a sampling of three Airport Security Operators
told the researcher that they condemn this practice since
the funds are needed to make ongoing improvements to
airport taxiways and infrastructure.   If improvements are
not made or are postponed, there are no immediate plans to
recoup those funds.

Locally issued Airport Bonds are a common way to raise
capital investment funds. However, uncertainty about the

amount of funding needed, the ability of the federal government to reimburse the funds spent, security changes from TSA, and airport revenue losses cause deep reservations about issuing bonds. At the Security Summit, three airport operators informally interviewed by the researcher stated that fear of changes by the TSA has held them back from making security improvements on their own. They explained that airport users would be forced fund the improvements in the form of higher prices.

3. Working with the TSA

The civil aviation community and its security professionals are striving to cope with the rapid pace of change, implement daunting mandates and deadlines, work with an evolving new federal agency, and deal with serious funding constraints. They are dealing with all of this in light of the ongoing battle against future terrorist threats. Airport Security Directors told a Congressional panel that they are displeased with TSA's approach and that they believe their advice and concerns are not welcome (Johnson, 2002).

The airline industry has approximately 600,000 direct employees. The TSA is bringing in between 60,000 and 70,000 additional employees (depending on the source). That represents ten percent of the entire industry.

A potential conflict of interest could arise. Whereas the FAA was the overseer and regulator of the industry, TSA is now involved in daily operation as well as regulatory function. This could change its willingness to report real problems. Previously, reporting on aviation issues was very open, and the results were widely available and

disseminated. One anonymous airline industry representative said to the researcher, "I say this clinically, not cynically, you're not going to hear about security failures."

G.   THE EUROPEAN MODEL

In the aftermath of September 11, many press and public figures pointed to the success of Europe's airport structure and felt that this model had much to offer.

Since Europe comprises so many countries, there would be too many structures to look at here. Thus, the model chosen for discussion is that of the United Kingdom, which has been acknowledged as one of the best and most successful of the European models. This section explains how, in the U.K., airport ownership, law enforcement, and baggage screening are arranged.

1.   What is the European Model?

Many Western European countries dealt with terrorist threats by federalizing their airports. As recently as twenty years ago, many were still run that way. Since then, a different approach has been used: privatization. Many of these countries created self-supporting airport corporations for most major airports (Poole, 2001). While some continue to be government-owned privatized companies, many have completely privatized. Table 4 shows a sample of some of those airports.

Privatized	Belfast Copenhagen Frankfort London Rome Vienna
Privatized Quasi-Government company	Manchester Paris

Table 4.　　　European Privatized Airports. From Poole (2001)

These cities found that by privatizing, the benefits of cost controls and management from "for profit" corporations made them both effective and efficient. The government was able to retain the regulatory agency and lay out tough standards and impose tough sanctions if those standards were not met. It was up to the individual airport to determine how to meet the standards.

The United Kingdom was the first country to privatize. The airport authority, the British Airports Authority (BAA), was created in 1965 as a privatized government agency, incorporating in 1987. The BAA is a publicly held company traded on the London Stock Exchange. Recognizing the BAA's success, many other governments followed suit. BAA is private, it is motivated by profit to find the best ways to hire, train, implement technology, control cost, meet regulations and provide high levels of customer service.

Interesting to note is the fact that many of the same companies hired in various European airports are also used in the United States. The major difference is that, in

Europe, they deal directly with the airport or government instead of the air carrier (Poole, 2002).

2. Law Enforcement

Suomi (2002) says that BAA takes a different approach:

> They look at airport security as a critical element of the total airport management. They take a little bit different approach to it. . . . [T]hey look at it as more of a system. Therefore, the private sector employees that are manning the screening checkpoint are higher caliber, higher paid airport security on more of a career path.

The U.K.'s airports' armed police are provided by local government. They are based at the airport and respond by alarm from the security checkpoints, although they do not run them. The airport must pay the local authorities for providing the police (Suomi, 2002).

3. Baggage Screening Operations

Many airport operators view BAA's baggage screening system as the most desirable model (Martin, 2002). Its creation was a direct reaction to the terrorist bombing of Pam Am Flight 103, in December of 1988, which exploded over Lockerbie, Scotland, killing 259 passengers and 11 bystanders. A luggage bomb, which was intentionally checked aboard a flight in Germany by a Libyan terrorist, changed planes twice before ending up on the Pan Am flight. There was no doubt the target was America via an American air carrier.

In the U.K., this terrorist act caused a revolution in baggage handling (Martin, 2002). The response was to build a system preventing baggage from traveling unmatched to a passenger and unscreened for explosives. It took an investment of 14 years and $300 million dollars to

implement this system at London's Heathrow International airport, the fourth busiest airport (passenger movement) in the world (ACI, 2002). BAA administers the system.

The system consists of tiers with all bags passing through the lowest tier. If a bag does not clear a lower tier, it is shunted into the next level for further scrutiny. Heathrow's is a five-tier system, which uses X-ray machines, threat analysis software, human screeners, and sophisticated scanning machines (Computed Tomography (CT) and Standard Projection (SP)). The system minimizes human interaction and maximizes machine processing. Humans intervene on an as-needed basis only. All bags are inspected, including those that are only changing planes. The relative absence of human intervention minimizes customer inconvenience and delayed flights and baggage. Appendix C contains a diagram of the system.

Although the European baggage handling system has been highly successful, Poole (2001) says:

> Ironically, the three biggest security firms in Europe—Securitas, Securicor, and ICTS—are the parent companies of the U.S. firms that provide 60 percent of all passenger screening here. Yet while turnover of European passenger screeners is less than 50 percent per year, it's often between 100-200 percent in this country. Why? Because you get what you pay for.

4.   Flaws of the European System

It should be noted that, although the European system has many exemplary features, it does have some flaws. Several of the subjects interviewed for this thesis expressed concerns that are discussed in this section.

An airport security analyst noted that the reject rate on the scanner-type machines such as the CT and SP is high. A different standard is needed to keep the reject rate at an acceptable failure rate or else it will cause throughput problems. The analyst noted that their luggage reject rate is much lower than the U.S. standard. No one has solved the problem yet, and the concern is that they will miss something. The key is the front end (profiling).

An industry analyst stated that European air carrier operations, generally speaking, aren't as extensive as the United States' (in terms of numbers of annual flights and airports). While they might have good techniques and systems to learn from, there's no system where you could do exactly that."

One airport security operator noted a potential problem with using EDS only in later stages of screening. He said, "They [Europeans] are counting on the x-ray machine for most of the screening. The difference between an x-ray machine and an explosive detection machine is fairly significant."

In fact, the recent advances in plastic explosives in Europe and the former Soviet block countries could test the capability of the front line x-ray machines. A two-dimensional back scanner x-ray machine coupled with CT technology is necessary to discern an explosive materials profile. For that reason, the government did not approve x-ray technology as a system for finding explosives. It will identify only five of the six explosive categories currently tested in the FAA technology centers.

H.   THE ISRAELI MODEL

After September 11, many press and public figures pointed to the success of Israel's airport structure and felt that this model had much to offer. Israel's airports have been acknowledged as among the safest and most successful in the world. Israel's is viewed as the most invasive of all aviation security systems models.

1.   Ownership

Israel has one international, state-owned airline, El Al, which operates out Israel's only international terminal, Ben Gurion Airport. Israel adopted the European style of public-private airport ownership about five years ago (Poole, 2001).   The government regulatory agency, Shabak, acts as the regulator for the Ben Gurion Airport Authority, which must meet the government's standards.

2.   Security

Israel's success lies in its invasive, interrogational approach. The goal is to identify terrorists before they embark on one of its planes. Sky marshals are present on all flights, and a team of agents interrogates passengers upon check-in. They don't ask yes or no questions. Rather, they typically ask where the passenger is going, why, whom they know at the destination, and why they may have used cash to pay for their ticket. Nothing is taken for granted.

With approximately 30 aircraft providing service, Israeli officials have the time to implement such a rigorous system and maintain their schedule easily. They hire private contractors to provide profiling software (ICTS) to the government and pre-boarding screening (Amishav)(Poole, 2001).

3. Flaws of The Israeli Model

While most Israeli airport officials agree that this model works for them, they don't have the operational tempo of passengers, baggage, flights, or cargo volume of the American air carriers. Israel has 35 airplanes and one airport, whereas the United States operates 453 airports and 6,000 planes. The daily throughput of passengers and baggage in the United States will not permit such time intensive procedures. Customers will simply look for alternative means of transportation.

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IV. DATA ANALYSIS

A. INTRODUCTION

This study provides insights from civil aviation security systems experts on pre- and post-9/11 airport security. These officials were asked in person or in phone interviews for their views on 21 aviation security issues.

This chapter summarizes their responses. Many of the experts' answers were similar in theme; those that best expressed their sentiment or had something unique to express are presented.

While the experts interviewed do not speak for the entire industry, they nevertheless provide insights into current issues that are changing their industry and may be representative of the views of their professional contemporaries. All respondents were assured that their responses would remain anonymous.

B. THE INTERVIEW RESPONSES

1. What Was America's Posture Pre-9/11?

The majority of respondents believed America placed a high priority on airport security. Reasons for this belief include a previously successful record of security incidents, emphasis on minimum customer inconvenience, and stressing airline safety over security. However, there was a range of opinions:

Aviation Security Consultant:

America has always placed a pretty high priority on airport security… One answer might be there was sufficient priority against the known threats… It was an issue of whether or not airport aviation security was seen as a national

security issue. It wasn't; it was seen as an aviation security issue.

Airport Security Operator:

Given the level of threat during that period of time prior to September 11th, it was a tough sell. The flying public didn't like being inconvenienced by then existing security measures.

Air Carrier Advocate:

Prior to September 11th, there was a lot of emphasis on aviation security. The industry and the FAA, the intelligence community had fairly good security programming. We weren't prepared as a country to deal with suicide terrorists in civil aviation.

2. Are the Airport Authorities that Currently Perform Non-Baggage Screening Operations (Like Those Run by City/County Authorities) in a Better Position to Assume Security Responsibilities than the Federal Government? If so, Could They? Should They?

Opinion was divided evenly on whether airports are in a better position to assume security responsibilities. Most felt that, without immediate government action, no significant change in quality of personnel or compensation would have occurred. Without immediate improvements in funding, personnel, and compensation for screeners, airports would not have been better off than they were before the federal government assumed security responsibilities.

Aviation Security Consultant:

Well, they [airports] don't want the responsibility; they don't want an unfunded mandate. If you give them the money to do it and hold them accountable, I think they would be

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happy to do it. But what they did not want was
to be put into a position and say 'you're going
to do it, you're going to pay for it and here's
how you're going to do it.' I don't blame them.

Airport Advocate:

Many of our airports think they would be more
responsive because the airport is in a better
position to know its service patterns, its
facilities, its general make-up than the federal
government. They would be prepared to do it if
they were provided liability protection, which is
a major problem right now in the insurance
industry and [if] they were provided some form of
resources or if they were able to put the cost
into their fee base with the airlines.

Air Carrier Advocate:

We had never been in support of the aviation
community [air carriers or airports] taking over
the screening function or security. The
difficulty with that is you can't have a local
option, local approach when you're trying to run
an integrated aviation system from an operational
standpoint.

Airport Security Operator:

I, quite frankly, think it is better handled by
the government rather than by individual local
communities. I think the only way to get
standardization in the security field is to have
one entity responsible for it.

**3.   Were Many of the Federalized Employees Formerly
      with   Private   Contractors?   If   Yes,   What
      Difference Will Federalizing Make?**

Most agreed that it was too early to tell since
federalized screeners have assumed operation in just one
airport thus far (Baltimore-Washington International). They
did agree that federalizing was the most expedient way to
allow for better-qualified personnel with higher pay

benefits and a career path.   It is too soon to tell if
better-quality screening will be achieved.

<u>Federal Aviation Regulator:</u>

. . . the hope is they are going to get the best
of the screeners who were already there.

<u>Aviation Security Consultant:</u>

. . . You attract probably more highly qualified
people.   It's always been one of the lowest-
paying jobs at the airport.

<u>Airport Advocate:</u>

Federalization has taken care of two of the major
points and that's training, which the federal
government will be accountable for, and turnover.
Could you have done that with a different model?
Yes, but nobody did. So, when the failure came,
people saw federalization as the answer.

<u>Airport Security Operator:</u>

I was in favor of federalization because I knew
if the government took it over we'd be able to
raise the bar in terms of compensation.   I
thought compensation might lead to high-caliber
individuals.

<u>Airport Security Operator:</u>

I, quite frankly, think it is better handled by
the government rather than by individual local
communities. . . . I think [what is important] is
no matter who they hire . . . there will be one
training standard, one quality assurance standard
that those employees will to be held to.

**4.   Do You Think Airport Security Should Be
Federalized At All?**

The respondents were evenly divided.   Those who
favored federalizing, with the exception of one, felt it

helped set standards or was the right thing to do in lieu of a better method.

Aviation Security Consultant:

No. First of all, it's a fragmented responsibility. Airport security is not federalized, only part of it is federalized. No, I don't think it was a good idea.

Federal Aviation Regulator:

My biggest concern about federalizing the screening function is [that] the same agency is overseeing themselves in terms of oversight and performance of their operation.

Air Carrier Advocate:

We felt that the screening process needs to be federalized . . . as part of an overall federal approach to national security. We didn't support keeping security privatized.

5. What Do You Think About Keeping Security Privatized with Federal Oversight?

There was no clear consensus, with half agreeing that airport security should be privatized. The other responses ranged from strong support for keeping it federalized to no strong opinion as long as better-quality work is produced.

Federal Aviation Regulator:

So, a strong federal oversight is really important. That is why I don't think the airport should be doing it because I think we need something unified.

Aviation Security Consultant:

I think the job of the federal government is to set the standards, to ensure the standards are met and to keep the standards up to date. Had the FAA been tougher, I think it would have worked just as well as if the federal government

had taken over.

<u>Airport Advocate:</u>

I traditionally think operations are better done by the private sector with tough federal accountability.

<u>Air Carrier Advocate:</u>

I think it could have worked either way if they had the appropriate enforcement and oversight mechanism in place.

6. Aside from Baggage Screeners, What Other Positions Are Likely to be Federalized?

Most agreed that there would not be much more expansion outside of passenger and baggage screening functions, but many felt uncertainty about future changes. The Aviation and Transportation and Security Act calls for assumption of law enforcement, in support of the screening functions, but has been stalled due to agency funding and resource constraints.

<u>Federal Aviation Regulator:</u>

I don't think that has been figured out yet. I have not heard anything about TSA assuming access point [secured entrances for vendor and airport staff] screening. Things are changing every day.

<u>Aviation Security Consultant:</u>

. . . I don't know what the political pressures are going to be from the airlines and the airport authority to retain some portion of airport security. So, it's a real question about the role of federal government. But I think the jury is still out.

<u>Airport Advocate:</u>

There's been some talk about whether you might have perimeter security and other law enforcement

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officers federalized. But, your question is whether they would likely be and the answer is no simply because of resource constraints.

7. If Federalized, Employment Competition is Essentially Eliminated. Do You Think Complacency Could Become an Issue?

Most felt that complacency is definitely a concern for two reasons. First is the fear of a slow-moving government agency, such as the INS or the Post Office, which is why most felt that the TSA included a provision for competition, allowing private screening companies in the future. Second, the screening function itself is monotonous and naturally leads to boredom and complacency.

Federal Aviation Regulator:

Federal agencies are slow-moving, and they don't have competitors. Yes, it could become an issue. There was a real concern for competition and this [provision to allow private contractors in a few years] is a compromise to leave the door open for it.

Aviation Security Consultant:

Complacency could always be an issue. I don't think it matters whether you work for the government or a contractor. If they go back to private security with federal oversight and the contractors are doing a better job, then I think you'll see more and more airports trying to do that.

Airport Advocate:

Complacency can emerge, even if there is employment competition, because a lot of the jobs they're talking about are very routine. Yes, you have reduced some employment competition. And yes, potentially, complacency could become an issue.

8. **Considering the Difficulty of Terminating an Employee Now, Do You Think It Will Be Harder or Easier to Make Employee Changes if They Are Federalized?**

All respondents acknowledged the traditional difficulty of terminating a federal employee and recognized that the TSA made strong provisions to overcome these difficulties. Most agreed that Congress addressed this issue with wording that was strong enough to make termination no more difficult than in the private sector.

Aviation Security Consultant:

I think Congress was aware [that], traditionally, [in] civil service [it] is a very long process to get rid of a bad employee.

Federal Aviation Regulator:

It will definitely be harder to get rid of an employee. How difficult will depend on the new way they were allowed to organize as a results-based organization. So, it will depend on how the contract is laid out.

Airport Advocate:

They are still federalized; that will make them harder to get rid of.

9. **What Do You Like about the European and Israeli Airport Security Models?**

a. *European model*

The range of respondents' knowledge of Europe's approach ranged from little to very knowledgeable. Most recognized that there is not really one style to claim as the "European model." They vary from country to country. Most like the fact that European screeners receive more pay than American screeners. They believe that the European system attracts better-quality employees, offers more

flexibility in decision-making, and uses a better approach to luggage screening. Many thought that we could adopt the good aspects of the European system, but that we should not completely mimic their approach.

> ### Aviation Security Consultant:
>
> They have more flexibility to change and modify things. Ours is going to be cookie cutter.

> ### Airport Security Operator:
>
> . . . Maybe more than the screening processes of passengers, we have to look at the screening processes for checked baggage; they have been quite a ways ahead of us.

> ### Aviation Security Consultant:
>
> If you look at European operations generally, they just aren't as extensive as us. So, while they might have gotten good techniques and systems that you could learn from, there's nothing that you could say "ok, let's do exactly that." I don't think there is a European model. I think there is a country-by-country model and almost an airport-by-airport model.

b.   *Israeli Model*

This model drew the strongest opinions. Even those who knew little of Europe seemed to have strong opinions of this model. Most admired Israel's success and ability to screen one hundred percent of passenger baggage. It works well for them. Several admired the way their screening process begins before the passengers arrive at the airport, as well as their profiling program. These are approaches we should look at more closely.

. . . the hard, tough profiling they do of passengers is certainly something we ought to give some stronger consideration to.

Aviation Security Consultant:

. . . it takes nothing for granted. Our protocols in the past have relied on yes/no answers to questions. . . . The Israelis never ask a question that could be answered yes or no.

10. What Do You Dislike about the European and Israeli Models?

a. European

There were no negative opinions.

b. Israeli

It was too intrusive of privacy, and Americans probably would not like an interrogation-like screening process. Additionally, it would greatly increase passenger- and baggage-processing time.

Air Carrier Advocate:

Look at the size and scope of what goes on in Israel compared to us; David Ben Gurion airport, in any 24-hour period, has about 46 international departures. When I was at one of the airlines, we flew more international operations in one day than El Al flew in one month. The passenger[s] [have] to subject themselves to a two- or three-hour process. They have no real domestic aviation system. Primarily, they have international flights. It's just not going to work [in the U.S.].

Airport Security Operator:

We can never survive with the El Al model. It wouldn't work. We would collapse the air transportation system, in a moment, if we tried to do that. . . . They [give] everyone a physical

search, a strip-search. It's certainly an incredibly detailed kind of security and almost low tech.

<u>Airport Operator Advocate:</u>

You can't treat everyone the way the Israelis do. We can move to . . . more of an intelligence-based, data-based model, which is the way we will ultimately go and the best way.

11. **Airports are Quite Different from One Another in Terms of Size, Design and Ownership. Do You Think the Government Should Provide Performance Standards and Let the Local Airport Authority Determine the Best Approach as to How to Achieve Those Standards?**

The majority of respondents strongly favored this approach. Several were adamant about ensuring that strong performance standards were in place as a minimum. Those who felt that the federal government should determine the best approach had strong opinions.

<u>Federal Aviation Regulator:</u>

No, I don't. I think that would be too close to what they had before with just the airlines [handling screening]. Airports would have other pressures besides securities. They are a business that needs to make money. They have a lot of competing pressures. I don't think they should be determining the best approach.

<u>Aviation Security Consultant:</u>

. . . [S]et federal standards and let the local people say how to apply them. What the Gore commission recommended was a mandatory vulnerability assessment. I mean, you want a federal standard in baggage screening. A local security plan ought to be based on a vulnerability assessment and then attempt to seal off those places.

Airport Security Operator:

You can certainly, as an airport, go above that
and establish other kinds of local procedures,
for let's say, access control, or the deployment
of special systems for something like that to
enhance your program. But, the fundamental stuff
[minimum federal standards] cannot be tampered
with.

Airport Security Operator:

. . . [I]in terms of perimeter and access
control, I would say yes. In terms of screening
passengers, baggage and cargo, no.   That's
because of the liability issue.

**12. Would you Like to See Some Flexibility to Allow
Airports to Experiment with Different
Technologies, Techniques or Tactics to Develop
Best Security Practices?**

Most respondents would like to see airports allowed
some flexibility, in addition to federal standards, in
developing and testing better security practices.

Federal Aviation Regulator:

I think that's a good idea. I would like to see
that kind of flexibility. Right now, it is all
being controlled by TSA. They are trying to
implement new technology at a few airports like
Baltimore-Washington. I think other individual
airports looking at new technologies would be a
good idea.

Aviation Security Consultant:

Absolutely. I would like airports to experiment,
so long as the minimum standards are being met.

Airport Advocate:

Yes, I think the federal government can add to
it. Airports are going to do this anyway because
they're under the employ of local governments.

Aviation Security Consultant:

Set the standard and let the local guy do what he
needs to do. The more flexibility the better as
long as they meet the standard. This isn't going
to happen anytime soon.

13. Should There be Established Standards for Passenger and Baggage Inspections, or Should There be Randomness at the Local Airport Level?

There was a wide range of answers. The only consensus
was that the majority wished to see some established
standards and some form of additional local randomness.

Federal Aviation Regulator:

Yes, there should be both. I think established
standards brings you up to a uniform level. . . .
[T]he randomness is the only hope of catching the
unexpected, very rare event. If you stay only
with procedures and keep within standards, then
one only has to learn what those procedures are
and get around them. So, I think it's imperative
to have that randomness as well as [a] high level
of standards.

Airport Security Operator:

Well, I think what we need is profiling and
screening of passengers. If we know somebody is
a good guy, we ought not waste our time on the
good guy. They need to be focusing on where the
bad guys are.

Airport Security Operator:

I think we must have randomness in the system.
If not, the terrorists will learn the process and
develop means to compromise the system. The
greatest fear everyone has is that we will have a
9-11 situation that says the airports or the FAA
did something wrong. However, it is my opinion
that we did not do anything wrong. It's that the
terrorists knew what the procedures were and how
to avoid or compromise those procedures.

I think I would not want it to be random, but I would want differences at the local level and that depended on what the perceived risk is. The international gateways are going to be riskier; Miami, San Francisco, Chicago, Los Angeles, San Francisco, New York are places where large amounts of international traffic come in, so you might want to take a different approach there. But, you wouldn't want that to be random; you would just want differences.

14. What are the Biggest Challenges of Implementing the TSA's New Guidelines under the Aviation and Transport Security Act?

There was a wide range of strong opinions. The respondents identified three major challenges: the Congressional mandates of the TSA act create a harried environment for its constituency, trying to create a brand new federal agency; there is a lack of adequate funding; and the Congressional mandate for 100-percent implementation of Explosive Detection Systems (EDS) machines at every U.S. airport will be difficult to achieve. Secondary challenges were the requirement for 100-percent screening for passengers and employees and a lack of comprehensive public policy.

Federal Aviation Regulator:

I'd say the first challenge is they have to create a federal agency from scratch. They're saying they are going to hire 60,000 people. They have to create the framework, the bureaucracy; they have to hire the people, and all under extremely tight deadlines. It's an unheard of task.

Airport Security Operator:

The challenge is how are we going to meet the

statutory law created by Congress. The second thing is we're never going to, in the near term, be able to screen airport employees and vehicles to the same degree as passengers and their property. . . . [T]hey are going to have a tremendous climb to find all the employees they need. They are going to have a struggle finding 70,000 employees.

Air Carrier Advocate:

The biggest challenge is coming up with a comprehensive public policy about where we are going. Not just dealing with the acts itself and the deadlines, but a public policy that identifies: What we are trying to do. What is the threat? How are we dealing with the threat? What do we believe is the best approach for trying to deal with that threat? Let's get the best available technology. Let's go back to the drawing board and look at everything again before we go forward.

Aviation Security Consultant:

The biggest challenge is that the law's requirement for purchasing and deploying EDS machines is impossible. The second challenge is this business of providing 100-percent screening for workers and 100-percent screening for passengers. Security people say you can't do that without bringing the system to its knees. You've got to trust some. Even if it could be implemented, it's a bad law. They wrote stuff into the law that can't be done.

15. Does TSA Incorporate the Stakeholders' Views and Concerns?

All strongly stated that TSA is not incorporating the viewpoints of the entities that have the most at stake: airport operators and air carriers. A few mentioned that some TSA representatives recently made overtures to incorporating airport operators' and air carriers' views

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into decision making and policy, but those respondents assured the researcher that this was not the norm.

Airport Security Operator:

At this point, it has been a holistic, top-down approach with a law enforcement bent, who know little or nothing. As someone said to me, "they (TSA) don't know what they don't know" about the aviation business, both the airlines and the airports. And they are learning the hard way. They are getting knocked in the side of the head by Congress and the airports for their failures in terms of communications, about understanding the way business has to be done at the local level, and our concern for customer service.

Airport Security Operator:

I think there is a combination of 'top down' and soliciting comments.

Airport Security Operator:

We don't think the TSA probably embraced the airport operator's perspective and really listened to some of the things going on with us. I think they are too busy trying to get it done.

Airport Security Operator:

There's a top-down approach by and large, but it's getting better. . . . Thus far, I have not seen any development that makes me think it will be anything but top-down. But, I think top-down would be a mistake, because it would also be a "one size fits all approach" instead of a performance-based or airport approach.

Federal Aviation Regulator:

From what I have been hearing from airport operators . . . it is a top-down approach definitely, but it's an outsider approach. The teams that are being put together [are] corporate teams, with a corporate mentality. But, they are

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not bringing airport perspective. They have not been a voice in the process. Decisions and structural changes are being made and they feel they are not part of the process.

16. Are Areas of Responsibilities Clearly Defined?

This question had the most unanimous response of all the questions asked. Almost all respondents stated that responsibilities were not clearly defined. Much of the uncertainty was due to some of the regulations in the Act not being executed by the TSA. Much of that is due to lack of funding or manpower or wording in the Act itself that may prevent clear responsibilities from being established.

Air Carrier Operator

Absolutely not. There are tons of issues. It is like TSA is taking over some screening, but they are not taking over all screening. For example: catering screening . . . It [the TSA Act] clearly says TSA needs to do the screening. TSA says we're not going to screen catering objects; it's based on the financial ability to do it. . . . So, there are no clearly defined roles and responsibilities. They are picking and choosing what they want to be responsible for and what they are willing to pay for.

Aviation Security Consultant:

I don't know about "clearly defined"; the TSA thinks it's all theirs, and everybody else had to follow their orders.

Airport Advocate:

It's getting there. We know passenger and baggage screening is TSA's responsibility and obviously the other two legs on the stool support that. Screening of employees, perimeter security, access to the aeronautical area, intelligence piece [profiling and Federal interagency database], these are all functions that still require some role delineation among these three.

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. . .   My fear is that [funding] is going to
drive the roles rather than roles driving the
money.

<u>Aviation Security Consultant:</u>

They are not clearly defined, and what's worse is
there is no single overseer. You've got three
entities that are responsible for different parts
of security and nobody is in charge of all three
of them. . . . The [ATSA] law's a factor; the
start up is a factor, yeah, absolutely.

17. What is the Impact of the TSA's Security Requirements on Federal and Local Airport Funding?

The majority of the respondents agreed that the
additional funding impact on both federal and local
agencies has been enormous.   The airports have drained
their resources and now wait for further federal funding to
carry out future security improvements.   Some felt the need
to tap into other non-security funding, decreasing funds
available for infrastructure improvements. The uncertainty
about federal funding has forced the industry to take a
"wait and see" approach about future security plans.   Many
agreed that the costs would ultimately be passed on to the
public in one form or another.

<u>Air Carrier Advocate:</u>

We're up to the point now where . . . 40 percent
of your ticket price is tax [on a $100 domestic
ticket].[9]   So, what you're doing [with] that
incremental pricing, in a way, is driving away
the leisure traveler to their cars.

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[9] Upon further research, the tax is 44 percent on a $100 domestic
ticket, 26 percent on a $200 domestic ticket and 19 percent on a $300
domestic ticket. Source: Air Transport Association:
http://www.airlines.org/public/industry/bin/TaxOverview.pdf.

Airport Security Operator:

We have been seeking additional grants to improve airport security. Also, we have spent a lot of money since 9/11. This is city money to implement a lot of the security procedures and requirements. It has been a drain on both the federal and local systems.

Airport Security Operator:

. . . [O]ur coffers are completely empty; therefore, it falls on the feds. The issue comes down to: do you expect airports to go after Airport Improvement Program money [AIP], which they use clearly to support airport infrastructure at the airport, runways and taxiways and kind of suffocate those projects, or are you going to make TSA funds available?

Airport Advocate:

What we hope that is that the federal government will fund mandates put on the airports and airlines, but that is not going to happen. They are going to partially fund them, which means the airports will have to absorb the costs. For the most part, what will then happen is the airport will put them in their rate base. What that means is, simply, the airport users funded the activity.

Aviation Security Consultant:

At this point, it's a guess. There is no money now to install the machines. TSA presumably will have enough money to buy them. The research I'm aware of says buying the machine is only 21 percent of the cost of getting it installed and getting it operational. Where is it going to come from? I think the answer is it's going to be enormous.

18. How Can TSA Best Assist in Improving Aviation Security?

Many strong opinions were stated in response to this question. Most respondents said that TSA needs to: listen to industry experts; develop better communications with its constituency; spend more money on research and development vice operations; and develop a threat-based strategy focused on profiling before the passenger arrives at the airport.

Air Carrier Consultant:

> Number one, a threat-based approach; number two, an integrated (profiling) process. The third point: allow movement through system processing [to be] less invasive than we currently have in place.

Airport Security Operator:

> . . . [C]ontinue to evaluate equipment and provide selection basis on the best types of equipment that can go into airports.

Airport Security Operator:

> TSA needs to start listening. Start listening to Congress. Start listening to airports. Start listening to the airlines. And make us active partners in this process. They are treating us like the enemy, unfortunately, and that's not the way it should be. We're the customer, and they need to start treating us like a customer.

Airport Advocate:

> Working with the other agencies of the federal government to put together a coordinated, cohesive, database on passengers who travel in the system and with that data, establishing a risk management plan that would rely on profiling.

Aviation Security Consultant:

By listening to the people who have had the responsibility. They've got to listen to the airports. Listen to the pros.

19. Would It Make Sense to do An Intense Random Search of, Say, One of Ten People, So That Nothing Gets by This Ten Percent, with the Idea That It Will Dissuade an Actual Hijacker for Whom the One in Ten Odds of Getting Caught are Too High?

Most respondents stated that random searches alone would not be enough to deter determined threats to the system. The odds of getting caught are not high enough; a decoy or innocent bystander could be used. Randomness, in addition to a sound profiling system to help identify possible threats, was widely supported.

Aviation Security Consultant:

Not really. The problem here is sheer numbers. In other words, they'd put 100 people in various airports. If only 20 get through, they've done their job. You need to find out who the people are in advance. The key is isolating the most likelies and searching them.

Airport Security Operator:

Something may get on the airplane carried by an innocent person that could cause harm to others, such as a weapon. . . . So, I'm not for 100-percent checking of bags, but 100-percent screening of persons and their carry-on luggage is necessary.

Aviation Security Consultant:

I would like to see two kinds of profiling systems. The first is bringing together the federal database. In the second group, you would have a random system. Randomness is critical.

Air Carrier Advocate:

I think we're willing to be more invasive than
that. We think the proper construction of a CAPS
II [profiling] program will permit, basically, a
pretty healthy assessment of individuals. . .
.[T]he CAPS process will help delineate what that
is.

Airport Security Operator

I don't know about percentages. . . . I think we
need to create two levels of passengers. Figure
out who the good guys are and issue them an ID,
if they are willing. Those that are not willing
to get an ID and don't want to work with the
system, then they should be 100-percent screened.
Then maybe do a 10-percent sampling of the good
guys. . . .

20. Does it Make Sense to Give an 80-Year-Old White, Black, or Hispanic Woman the Same Security Check As You Would a 22-Year-Old Male Arabic-Looking Person?

The majority of respondents agreed, while it may not
make sense to do the same check for all passengers, that an
80-year-old could be duped or even be part of a hijacking
under certain circumstances. If you just chose ethnicity
without further justification, that would be
discrimination. All agreed that profiling is key to
avoiding embarrassing passenger searches.

Air Carrier Advocate:

. . . [E]verybody can honestly reflect on the
fact that there could be instances where, let's
say, . . . an 80-year-old was duped.

Airport Security Operator:

Yes. Keep in mind these guys are pretty creative.
If you've studied hijackings and bombings of
aircraft, especially [in] Europe, you'll know

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that people get used. They don't know they are
being used.

Airport Security Operator:

Yes. . . . if you are familiar with any make-up
artist. A 20-year-old can be made to look [like]
an 80-year-old with the right make-up and
disguise.

Airport Security Operator:

We should use a way to define who ought to get a
random search and who should just get the
standard package, and figure out how we're going
to do that, if it's an enrollment program,
trusted traveler. . . .[B]ut there ought to be a
way for us to look at, maybe not so much
profiling, but an identification program for who
ought to receive a higher level of scrutiny and
who shouldn't.

Airport Advocate:

Most of the time no, but sometimes yes. The key
to profiling is not ethnicity. The key to
profiling is to look at travel patterns of
somebody: is that person rooted in that community
and perhaps what their employment history is.
Those things put together may mean the 22-year-
old Arabic-looking person is less of a risk than
the 80-year-old person. You only come to that
conclusion by looking at a number of criteria.

Aviation Security Consultant:

Yes, it does. We've had elderly people try to
carry out suicide bombings. They use anybody.
They use children. You can't tell. Unless you
have reason to be suspicious of 22-year-old
Arabic-looking people, then you're just
discriminating against them.

Federal Aviation Regulator:

I've gone back and forth, personally, on this
issue. I guess the answer is yes, because if you

don't give the same check to all, then you're inducing a known weakness into the system.   I think that it does make sense.

21.   If You Got to Start with a Clean Sheet of Paper, What Kind of System Would Best Improve Safety for Travelers and Employees?

This question was the most open-ended, and it received the most varied responses. However, several themes emerged. The system that would provide best practices for improved traveler and employee safety included profiling, a trusted traveler program, and strong baggage detection systems. The next group of themes included an integrated screening process and a trusted employee program.

Air Carrier Advocate:

. . . [W]e really see this as an integrated, overall process rather than truncating it piece by piece and build[ing] them separately, which includes profiling, trusted traveler and employee, smart deployment of baggage detection.

Airport Advocate:

One approach I like since September 11th is building a system of redundancy. What we need to do on the front end [of passenger throughput] is to add that whole security intelligence piece. That would add the most important level of redundancy to it. That says you don't only have one line of defense—a system based on risk where you provide a base level of screening and security for travelers. If it fails, you still have some kind of backup, which is a classic security model.

Aviation Security Consultant:

Start at the local level. I'd start from the bottom up. Here are the federal standards; here is what we want you to do. You tell me how to meet those standards based on vulnerability

analysis conducted by all the stakeholders at your airport. Then show me how it's going to meet the federal standards. I would also have a bi-polar profiling system. There are people we should be concerned [about]; let's identify them and get that information out to the airlines. Then, you want the element of randomness and you want continuous improvement; you don't want to say 'let's meet this standard.' You want to encourage the locals to continually ratchet up security.

Airport Security Operator:

I think what needs to happen is that the the brightest in the airport business and the airline business, the security business, and the government business get together and determine the appropriate level of threat, risk and cost/benefit analysis. Then decide what is the appropriate mix of technology, infrastructure and resources to apply to secure our civil aviation system.

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V. FINDINGS AND RECOMMENDATIONS

A. INTRODUCTION

This study examined issues in aviation security brought to light by the events of September 11, 2001. These issues were approached both in historical terms and from the perspective of eight officials with a broad spectrum of aviation experience. Each interview participant was qualified to comment on the topic, and, considering the promise of complete anonymity, their views were presumably candid.

The overall conclusions of the study are based on an analysis of relevant literature, as well as on the themes that emerged from the personal interviews.

B. FINDINGS

1. Aviation was Not Adequately Prepared for Terrorist Attacks of the Magnitude of the September 11 Attacks

A false sense of security prevailed because there had been no serious threats on American soil. The warnings presented in studies such as the Gore Commission Report were ignored. The FAA did not have the resolve to implement recommendations or to tell the truth to its superiors and the public.

2. Congressional Mandates of the ATSA Have Driven TSA's Behavior

When the DOT Secretary told Congress of the difficulties involved with implementing the ATSA mandates, they rebuked him and set the tone of TSA's action. The ATSA mandates became the end instead of the means to better security. The 100-percent EDS equipment mandate is typical of this mentality. Congress rushed mandates and choices of

TSA senior leadership. Thus, TSA was left with little choice but to look for shortcuts.

3. The TSA Has a Top-Down Approach, and the Law Enforcement Background of its Senior Leadership has Alienated Industry Experts

The TSA's adversarial approach is ineffective. Lack of aviation operational experience is hindering the development of a solid working relationship among federal government, local government, air carriers and the public. The TSA is creating more problems than it is solving. The inconveniences imposed and the rising security costs are forcing customers to consider other means of transportation, while forcing financial hardships on air carriers and airports.

4. Funding is Forcing Difficult Decisions over How Much Security is Enough

Congress and the American public are facing important decisions over who will pay for improvements, causing frustration among all the key players.

5. The ATSA is Causing Confusion over Responsibilities among the Key Players

The lack of funding and manpower, as well as the wording of the Act, are making airports refrain from taking action. At the same time, TSA is trying to endure the difficulties of hiring 60,000 personnel.

6. The Potential for Complacency and Conflict of Interest Persists

The addition of so many federal employees raises concerns about government sloth and the difficulty of terminating government employees. While many actions were taken with the intent to improve the professionalism of the baggage screening function, no provisions were made in the

ATSA act to ease the difficulty of terminating federal employees when necessary.

7. Randomness is a Crucial Aspect of Effective Security, in Addition to Strong Minimum Standards that Apply to All Airports

Randomness will give each airport a uniqueness and a challenge to any threat potential.

8. Too Much Emphasis on "Single Point" Solutions, Such as the EDS Mandate

The EDS mandate and 100-percent baggage-screening requirement are indicative of focusing on single solutions versus a multi-layered security approach. The TSA is essentially putting all its eggs in one basket. It won't have enough funding or focus on implementing other, lower-cost, effective measures.

C. RECOMMENDATIONS

1. TSA Must Listen to and Work with its Constituency

Government must use a teamwork, partnership approach with aviation experts. Government must be the catalyst in involving regulators and experts to form alliances and share ideas and knowledge. The synergy created would produce innovation and practical applications to complex situations. Government must demonstrate a greater understanding of the economic repercussions of its actions on both the industry and taxpayers.

2. Incorporate a Multi-Layered Security Approach

This will provide comprehensive, long-term solutions that will involve all the key players in identifying and thwarting as many possible threats as possible. A team of security professionals using multi-level law enforcement agencies and the latest technology will provide the stiffest defense.

3. Use Technology to Identify Threats and Differentiate Friend from Foe

Profiling is the first step toward identifying potential threats before check-in. Inter-federal government agencies must share information and provide it to air carriers. Significant fears of privacy issues are justified and must be addressed. The Trusted Traveler and Trusted Employee programs are important components in identifying friend from foe. As one air carrier advocate stated: "Terrorism thrives on nameless, faceless people."

4. The Multi-Tiered European Approach to Baggage Screening could be Implemented Effectively

However, it will require a long-term, systematic approach. Implementation should be done in stages, beginning with our highest-volume international airports. Although this approach is only one of many steps in the total solution, it will minimize human interaction, providing more baggage throughput and less chance for human error.

5. Continue to Develop the Privatization of Baggage Screeners

Continued privatization of the screening process should be pursued. With proper personnel, compensation, and training, private companies in Europe demonstrate that airport authorities, whether quasi-privatized or privatized, know how to get the best performance for the right investment. These are lessons already learned from our European counterparts.

6. Areas for Further Research

The following are recommended topics for further research:

- Determine the impact the elimination of competition might have on the performance of the TSA's baggage screeners.

- Take a survey to determine what difference federalizing baggage screeners will make.

- Study the impact of the urgent mandates delineated by the ATSA on the industry and consumer behavior.

- Determine if TSA will incorporate aviation security experts' knowledge and experience into future security planning.

- Determine the fiscal impact of TSA *not* incorporating aviation security experts' advice.

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APPENDIX A. INTERVIEW QUESTIONS

INTERVIEW QUESTIONS

1.   Prior to September 11th, what priority did America place on airport security?

Federalized Airport Security

2.   Are the airport authorities that currently perform non-baggage screening operations (like those run by city/county authorities), in a better position to assume security responsibilities than the federal government? If so, could they? Should they?

3.   Are many of the federalized employees formerly with private contractors? If yes, what difference will federalizing make?

4.   Do you think airport security should be federalized at all?

5.   What do you think about keeping security privatized with federal oversight?

6.   Aside from baggage screeners, what other positions are likely to be federalized?

7.   If federalized, employment competition is essentially eliminated. Do you think complacency could become an issue?

8.   Considering the difficulty of terminating an employee now, do you think it will be harder or easier to make employee changes if they are federalized?

The European/Israeli Model

9.   What do you like about the European and Israeli airport security model?

10. What do you dislike about it?

Local vs. Centralized Approach

11. Airports are quite different from others in terms of size, design and ownership. Do you think the government should provide performance standards and let the local airport authority determine the best approach as to how to achieve those standards?

12. Would you like to see some flexibility to allow airports to experiment with different technologies, techniques or tactics to develop best security practices?

13. Should there be established standards for passenger and baggage inspections or should there be randomness at the local airport level?

Implementing the TSA Guidelines

14. What are the biggest challenges of implementing the TSA's new guidelines under the Aviation and Transport Security Act? (100% EDS, providing same screening for airport workers as customers, etc.)

15. Do you think TSA's approach incorporates enough of airport operator's views and concerns, or is there a "top down" approach?

16. Are the area of responsibilities between the TSA, airport authorities and airlines clearly defined?

17. What is the impact of the TSA's security requirements on federal and local airport funding?

18. How could the TSA best assist in improving aviation security?

Profiling Criteria

19. Would it make sense to do an intense random search of, say, one of 10 people, so that nothing gets by this 10%, with the idea that it will dissuade an actual hijacker for whom the 1 in 10 odds of getting caught are too high?

20. Does it make sense to give the same security check of an 80-year-old white, black, or Hispanic woman as you would a 22-year old male Arabic-looking person?

21. If you got to start with a clean sheet of paper, what kind of system would best improve safety for travelers and employees?

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APPENDIX B. SECURITY ACT

Major Provisions of The Aviation and Transportation Security Act
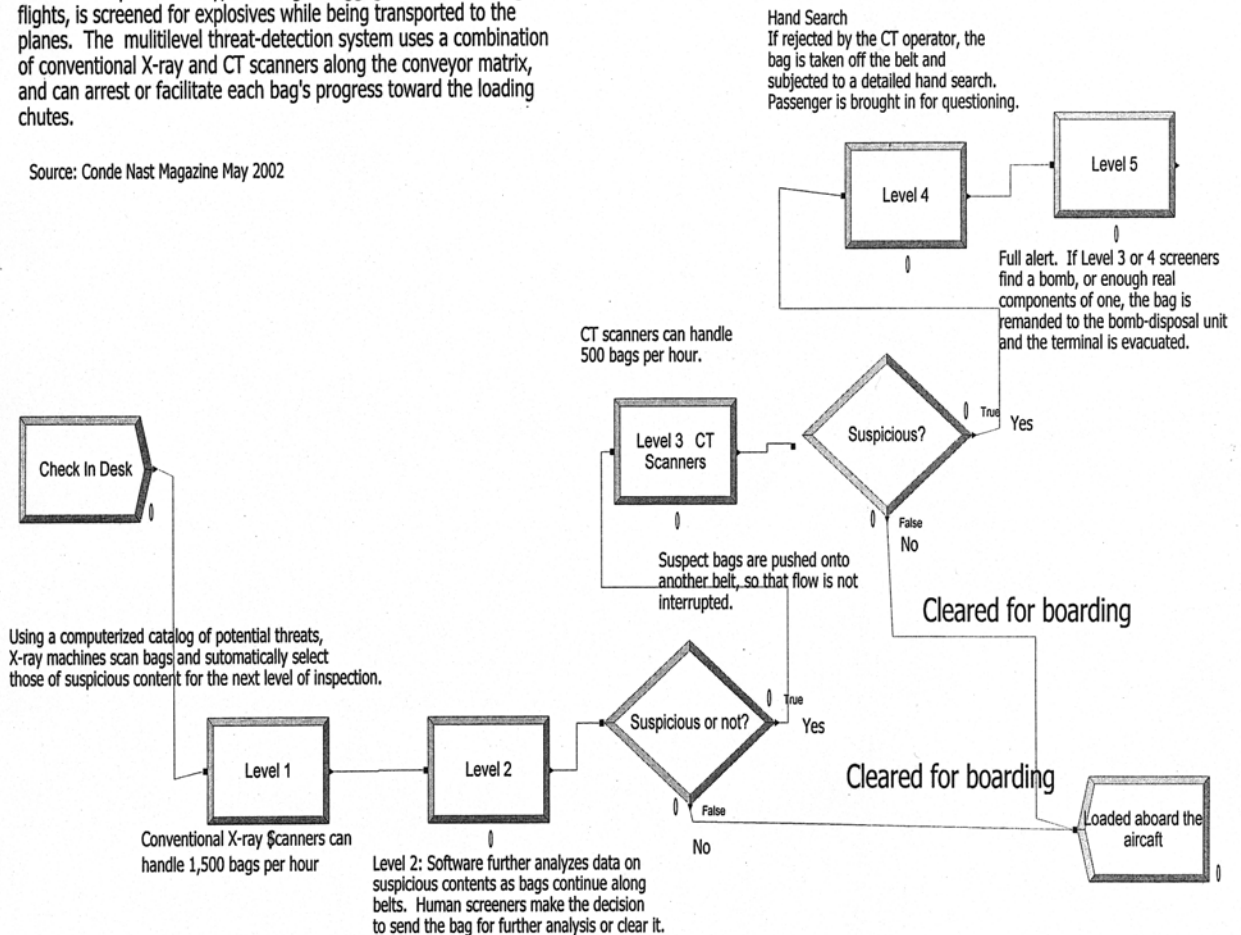
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London's Heathrow Airport baggage check system.

Every one of the 97 million checked bags departing from London's Heathrow Airport annually, including all luggage from connecting flights, is screened for explosives while being transported to the planes. The mulitilevel threat-detection system uses a combination of conventional X-ray and CT scanners along the conveyor matrix, and can arrest or facilitate each bag's progress toward the loading chutes.

Source: Conde Nast Magazine May 2002

Hand Search
If rejected by the CT operator, the bag is taken off the belt and subjected to a detailed hand search. Passenger is brought in for questioning.

Level 4

Level 5

Full alert. If Level 3 or 4 screeners find a bomb, or enough real components of one, the bag is remanded to the bomb-disposal unit and the terminal is evacuated.

CT scanners can handle 500 bags per hour.

Level 3 CT Scanners

Suspicious?   True   Yes

False   No

Cleared for boarding

Check In Desk

Suspect bags are pushed onto another belt, so that flow is not interrupted.

Using a computerized catalog of potential threats, X-ray machines scan bags and sutomatically select those of suspicious content for the next level of inspection.

Suspicious or not?   True   Yes

Cleared for boarding

Level 1

Level 2

False

No

Loaded aboard the aircaft

Conventional X-ray Scanners can handle 1,500 bags per hour

Level 2: Software further analyzes data on suspicious contents as bags continue along belts. Human screeners make the decision to send the bag for further analysis or clear it.

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